AUSTRALIAN SOCIETY FOR LIMNOLOGY

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LIMNOLOGY NEWSLETTER

Volume 22. Number 4. December 1984

The Australian Society for Limnology is an association of over 400 people with professional or amateur interests related to Australian inland waters Since its inception in 1961 the Society has played an important role in fostering limnological work in this country. The ASL promotes liason between limnologists in academic, private and governmental institutions and has a vested interest in the conservation of aquatic and related resources. Annual conferences are held near centres of limnological interest, and the programme includes scientific sessions, field excursions and social activities.

The ASL produces a newsletter with notes on activities, articles of general interest, book reviews and conference announcements; a Bulletin of original scientific papers and occasional Special Publications. A further publication is the Directory of Australian Limnologists.

Membership applications are welcomed; five classes of subscribing membership are available:

Ordinary Members : $15.00
Student Members : $6.00
Life Members : $200.00
Institutional Members : Fees on Application
Sustaining Members : Fees on Application

Membership subscriptions cover the period from 1 July to 30 June and members receive all publications. Members may also choose to receive the Australian Journal of Marine and Freshwater Research, the Australian Journal of Zoology and/or the Australian Journal of Botany at reduced rates. The subscription period for each journal is the calendar year following the year in which the subscription is paid.

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WATER QUALITY MANAGEMENT IN AUSTRALIA - FUTURE TRENDS

Barry T Hart
Director, Water Studies Centre
Chisholm Institute of Technology

Presidential address at 23rd Congress Autralian Society for Limnology
at Mt Gambier, 19-21 May, 1984.

Abstract

During the 1980's, the water industry in Australia will increasingly move from the present emphasis on the development of new resources to one where the existing resources are better managed. The protection and improvement of water quality will become a dominant management issue. If it is to more effectively manage existing water resources, the water industry must adopt, amongst other things, a more scientific, resource management approach. For this to occur, a number of fundamental changes will be required in the industry and these are discussed. Also discussed is the future role of the Australian Society for Limnology in influencing these changes.

Introduction

I have taken my lead for the Presidential address this year from our congress theme "Freshwater Quality Research in Australia". I will show the urgent need for such research if Australia's water resources are to be more effectively managed, and indicate some of the changes that must occur if the water industry is to respond to the challanges of the future. Although my bias will be towards water quality issues, it is recognised that these are not the only challenges facing the industry. Some of the broader challanges were addressed by speakers at the recent AWWA Summer School in Canberra (Lawrence 1984; McLaughlin 1984).

During the 1980's, the water industry will increasingly moving from the present emphasis on the development of new resources to one where the existing supplies are better managed. More effective management of these existing water resources, particularly to protect and improve their quality, will be dependent upon the water industry adopting, amongst other things, a more scientific, resource management approach. Water quality research, employing the talents of Australia's limnologists, will be particularly needed in providing a more detailed understanding of the nations

aquatic systems, an essential prerequisite if they are to be effectively managed.

The increasing stress that will be placed on water quality issues in the future management of Australia's water resources can be gauge from the recent Perspectives on Water Resources to the Year 2000 Report (POWR 1983), in which five of the eight major issues seen to face the water industry over the next decade, had direct water quality related aspects. These five were:

- protection and improvement of water quality;
- adequate provision for in-stream uses;
- co-ordinated management and use of water and land resources;
- improvements in data collection and analysis and information dissemination;
- provision of adequate funding for water resources purposes, including research.

Additionally, the present inquiry into the establishment of an Australian Institute for Freshwater Studies is a clear recognition by the Federal Government that the present information on our water resources is inadequate and that a new system for researching the issues is clearly needed for the future.

Clearly many of the changes now facing the water industry have come about because of increased societal pressures, pressures that to date have been largely ignored by the industry. Some of these are:

- demands for better quality water (but with the expenditure of less funds);
- greater recreational and aesthetic use of existing water resources because of the increased leisure time;
- greater public accountability demanded of the water industry;
- a more informed public that is increasingly reluctant to leave the decision making to the "professionals";
- greater pressures to adopt the most stringent standards from overseas (because of more rapid communications, these will be more quickly known by many sectors of the community);

Water Quality Issues in Australia

The Perspectives on Water Resources to the Year 2000 study engaged three consultants to address particularly water quality issues facing the nation over the next dacade. In a broad review of water quality, Garman (1983) concluded there were five major water quality issues of national significance:

- control of diffuse (non-point) sources of pollution;

- eutrophication;
- inadequate quality of rural water supplies;
- inadequate water quality criteria for management of aquatic ecosystems;
- lack of data and basic information and poor understanding of processes affecting water quality in Australia.

In reviewing perhaps Australia's most publicised water quality problem - salinity, Peck et al. (1983) stated "it is expected that both the extent and intensity of soil and water salinity problems will continue to increase to the year 2000". High on their list of needs was that "more effective research and monitoring is essential for efficient management of the problem."

O'Brien et al. (1983) addressed the other major, and until quite recently neglected, water quality related issue in Australia - the adequate provision for in-stream uses. In-stream uses include: recreation (e.g. swimming, boating, leisure activities); ecosystem protection; scientific and cultural use (e.g. site of ecological interest, sacred & religious sites, scenic value); and commercial use (e.g. navigation, waste "assimilation", extractive industries, hydro power generation). They identified sixteen major issues affecting in-stream uses in Australia: downstream effects of dams; the ecological effects of physical barriers in streams; the inundation effects of dams; the deterioration of waterways in urban streams; the recreational use of urban water supply reservoirs and catchments; catchment management; the recognition and protection of wild and scenic rivers; the effects of river improvement and flood mitigation works; the protection and management of estuaries; the protection and management of wetlands; the impact of pest and exotic species; the biological effects of water contaminants; the water quality constraints on recreational activities; the status of rare and endangered species; the impacts of extractive industries; the impacts of water-related recreation.

It is arguable that limnological knowledge of our water resources is most deficient. In its submission to the Interim Council, ASL summed up the situation thus:

> "There is insufficient limnological knowledge of Australia's inland water resources at the level of fundamental or basic research and at the applied level. In particular, there is a very poor understanding of the dynamic processes operating in aquatic ecosystems and the interactions between the biological, chemical and physical processes."

It seems clear that the next decade will see a much greater concern over water

quality, particularly in relation to:

(i) better quality drinking waters;
(ii) better management and protection of aquatic ecosystems;
(iii) ensuring recreational uses and other in-stream uses of water resources are protected.
(iv) salinity
(v) eutrophication

Implications for Water Resources Management in Australia

The water industry in Australia is presently undergoing considerable change (NSW State Water Plan 1983; White 1984), largely as a consequence of their not responding adequately to society's needs in the past. These changes will continue. As we have argued above, among other things the water industry will:

- become more management (rather than development) oriented;
- place increased importance on water quality aspects;
- become more publically accountable for their actions.

Below we examine some of the implications of this increasing resource management orientation and look at the changes needed if the industry is to adequately respond.

System process understanding

Natural resources, aquatic systems included, can only be effectively managed if there is an adequate scientific understanding of the way they function. This imformation will only come from well designed and conducted scientific investigations aimed at understanding the most important processes that control the functioning of the system. This will inevitably mean considerably more site specific research will be needed.

Throughout the country there are currently many water quality investigations in progress, however, the great majority of these concentrate heavily on monitoring the particular ecosystems. This reliance on monitoring is understandable, particularly so in programs mounted by government agencies. Yet exhaustive monitoring rarely leads to enlightenment. It is often simply that the questions to which answers are sought from a monitoring program are quite different to those which provide process

understanding.

If water authorities are to have any predictive capacity for the resources the manage, they will need to adopt new strategies that will provide a better understanding of these systems.

Professional staff

Australian water resources organisations are dominantly construction and operation agencies, often with a major rural orientation. Their highly trained professional staff reflect this bias. Increasingly in the future, however, resource management techniques will become more appropriate than the present engineering operations approach. Where then does this leave these organisations with respect to staff? One hopes that there will be a major shift in the types of skills recruited into the water industry. More scientific staff, particularly limnologists, will be needed, also more with resource management skills.

But I have serious reservations about the industries capacity to recruit sufficient of these "new breed". Major financial restraints on all public organisations, coupled with a small projected attrition through deaths, retirements and resignations (McLauchlan 1984), will limit the opportunities, even assuming the need is fully recognised by those in authority. ASL needs to take a more positive role in ensuring that more of Australia's highly trained limnologists are employed by the water industry.

Retraining and redeployment of existing staff will be the only realistic solution. Well conceived educational programs, hopefully organised in close cooperation with tertiary institutions and professional organisations (ASL could have a role here), will be needed. Such programs will include post graduate diplomas, tailored short courses for professional and technical staff, workshops and seminars.

Coordination between resource management agencies

There has been discussion for many years on the need for more coordinated approaches to water and land management (Downes, 1972; Pedder Inquiry 1974). Every State has a great many organisations with some responsibility directly related to, or impinging upon, the effective management of that States water resources (O'Brien at al. 1983). This leads to difficulties in coordination because of sectional interests that can override the state or national interest. To me the ideal would be an

organisational arrangement where the one organisation had responsibility for land and water management on a basin or catchment management basis.

A recent Victorian report entitled "The State of the Rivers", showed most graphically how the mismanagement of catchments can lead to severe degradation of streams running through the catchment. This report focused particularly on the impact of excessive catchment clearing, non-point source pollution, including erosion, and degraded stream frontages on stream quality and concluded:

> "Under the present arrangements there are many barriers to achieving effective river care at the regional level especially:
>
> - inadequate administrative and financing arrangements .....
> - inadequate technical resources and specialist advice .....
> - inadequate controls over public and private lands .....
>
> ...There is clearly a need to develop a better system of catchment and river management. But this can only be done if the public supports these improvements and is prepared to pay for them."

There are hopeful signs that Governments now recognise this need (White 1983, National Conservation Strategy 1983). But we have yet to see any positive indications that this recognition will be translated into actions leading to anything more than superficial changes to the industry.

Public interaction

It was argued above that water authorities will increasingly become more publically accountable for their actions. The major changes presently taking place in NSW and Victoria reflect this. The public are no longer prepared to leave all the decisions to the "professionals". Certainly as authorities progress further into the management of water resources, they will be faced with many more conflicts, the resolution of which will require skills that most do not presently possess in abundance. The recent conflict over the proposed damming of the Franklin River in Tasmania illustrates this point.

It is clear that water authorities will need to give much thought and effort to developing better avenues for interacting with the public in a meaningful way, and not just as an after thought.

Additionally, we believe that the most successful agencies in the future will be

those that undertake a regular, critical review of their performance, not just internally, but also utilising outside expertise and views.

Improved water quality management strategies

Along with the increased emphasis on water quality issues within water resource agencies, will come the need to develop improved strategies for managing water quality. Some of the factors that will need to be addressed are:

(a) identification of more specific and measurable water quality objectives for particular water bodies;
(b) develop better criteria of water quality for different beneficial uses - in particular this will involve introducing new biological indicators of water quality, and giving greater recognition to the stochastic nature of water quality;
(c) organise more appropriate water quality monitoring programs - these must address the stochastic (i.e. probabalistic) nature of water quality;
(d) ensure that water quality data are more readily available, both internally and externally;
(e) initiate relevant research on the system and ensure that the results are utilised for management purposes.

Water Quality Research

In comparison with other comparable overseas countries, Australia spends very little on water research in general, and on water quality research in particular. Countries such as Canada, UK and South Africa spend around 2.5% of the annual capital expenditure on research. The USA spends an even greater proportion (4%) on research. If Australia committed 2.5% of its annual expenditure on capital works on research, in 1980/81 this would have amounted to an expenditure of around $mill 25 (POWR 1983). The actual figure spent on water research in Australia was estimated to be around $mill 12 in 1979 (AWRC 1982), a far cry from the proportion allocated by other countries.

ASL, in its submission to the Interim Council (ASL 1984), summed up the situation most succinctly by stating:

"Water research in Australia receives insufficient funds, is fragmented and

poorly coordinated. There is an urgent need for increased funding and for the development of well defined national priorities. A National Water Research Council should be established to coordinate research and dispense funds within a series of national priorities."

This need for national coordination, without the previous clear dominance by the water industry of its perceived needs, was recognised by the previous government in setting up the National Water Research Council. It is to be hoped that the Interim Council will recommend a continuation of such a body.

Research, of both long- and short-term nature is needed. Long-term projects, of the order of ten years duration, are essential if coherent, useful research, at both the basic and applied level, is to be conducted. This long-term research could be carried out by an Australian Institute for Freshwater Studies if, as seems likely, this is established. A number of models are being canvased for such an Institute. I favour a small central Institute, cordinating a consortium of water research centres, each designated to conduct inter-disiplinary research into a specific area of freshwater research. These water research centres should receive guaranteed funding for five to ten years to permit them to establish a core research program. The short-term research should be organised via a project grant scheme along the lines of the previous AWRC scheme, but with greater attention given to the criteria used to select the projects for funding.

At an ASL sponsored workshop, held in Canberra in November, 1983, seven high priority areas of limnological research were identified (ASL 1984a). These were:

- study of the distinctive environmental features of Australian waters;
- a major focus on aquatic ecology;
- study of the taxonomy and distribution of Australian aquatic biota;
- research into catchment and water body interactions;
- implications of flow manipulation for in-stream uses;
- study of nutrient dynamics and plant responses;
- study of the response of Australian aquatic ecosystems to natural and anthropogenic perturbations, such as toxic contaminants, agricultural practices, bushfires, etc.

It is well to remember that a considerable amount of money is spent each year by the States in in-house "research". I believe that much of this "research" is lacking and that more effective and accountable use of the funds would be achieved if:

(i) there were open competition for funds between the water authorities, and research groups in tertiary institutions, CSIRO and consulting companies;

(ii) all research was open to peer-group review both at the inception and reporting stages - too many government research projects are never written up for the scientific literature, and thus are not openly reviewed by the scientific community.

The Role of the Australian Society for Limnology in Effecting These Changes

The senario I have painted is one where the water industry will be forced to radically change its present approach from resource development to resource management. This will not occur as rapidly as some of us would wish, nor without considerable reluctance by many presently within the industry. Additionally, many of the changes necessary have implications for us as limnologists, this being particularly so in the gaining of a better understanding of Australian aquatic systems and in introducing resource management skills to the water industry in general.

It is opportune therefore to consider the role that ASL might play in effecting these changes. Before considering some of these in detail, a few points on ASL's influence to date. In a word, ASL has had little influence on the water resources policy or the water industry in Australia. However, now is the time to decide whether we as the society of professional Australian limnologists wish to exert some influence in advancing our science. If the answer is yes - and I believe it should be - then there is one major reorganisational aspect that we need to consider. As presently organised, ASL has little capacity for major initiatives largely because its leadership changes each year.

If we are to play a more positive role in influencing government decisions and in promoting the science of limnology, we must look firstly to greater stability in the ASL leadership. One way to achieve this may be to vote in a block executive for a two year period. In standing for office, this block executive would pledge to undertake certain initiatives. Under these circumstances the voting would probably be best done by postal vote. Another may be to establish specialist groups, e.g. Policy Initiatives Group, for a period of say three years and with definate objectives to be achieved in this time.

However, before ASL considers adopting such changes, there must be ample time for discussion on all the ramifications, e.g. would the "flavour" of ASL be changed too

radically? how would the conference be organised? and so on. I would like to see a small working group set up to produce a working paper on the alternative structures the Society could adopt. This working document would be published in the newsletter thus allowing wide comment and discussion.

Given that in the future ASL will have a more responsive leadership, what then are some of the areas we should concern itself with?

Firstly, I believe ASL should be seeking to influence government policy, at both State and Federal levels, on water resources management. This should be pro-active rather than reactive, and will involve direct representation to ministers and government departments, making written submissions seeking representation on influential bodies, such as the NWRC and the new Rural Water Commission of Victoria. Additionally, there could be advantage if ASL combined with other kindred societies (e.g. AMSA, AWWA, Institute of Engineers, RACI) on certain issues.

ASL should also increasingly demand that more limnologists be employed in the water industry.

The educational role is one that ASL has not yet persued to any great extent. There is I believe scope for ASL, either alone or with tertiary institutions or other professional societies, to run training courses in limnology in each of the capital cities. To date we have only talked about introducing limnology at secondary school level, little has been achieved. We need to make a committment and then allocate sufficient financial resources to ensure it occurs - even if this means an increase in membership fees.

The other important area in which ASL can contribute is in assisting government in setting national water research priorities. A start has been made in this direction with the Canberra Workshop and the paper which was developed and submitted to the Interim Council (ASL 1984). This I believe was an important initiative and one that should be continued. We will need to give consideration to the process by which ASL updates these priorities which should reflect national needs and not just sectional interests.

References

ASL, 1984. Submission to the Interim Council of an Australian Institute for Freshwater Studies, Australian Society for Limnology, Newsletter 22(1), 2-10.

ASL, 1984a. Australian Limnological Research Priorities, Australian Society for Limnology, Newsletter 22(2), 4-9.

AWRC, 1982. Water Research in Australia: New Directions, Aust. Water Resources Council, Aust. Govt. Publishing Service, Canberra, 105pp.

Downes, R.G., 1972. Goals for Resource Management, in J.A. Sinden (Ed.), The Natural Resources of Australia - Prospects and Problems for Development, Angus & Robertson, Melbourne.

Garman, D.E.J., 1983. Water Quality Issues, Water 2000: Consultants Report No 7, Aust. Govt. Publishing Service, Canberra, 265pp.

Lawrence, A.I., 1984. New responses to the challanges of managing the water industry, AWWA Summer School, Canberra.

McLaughlin, A., 1984. Corporate management strategies for the water industry in the 1980's, AWWA Summer School, Canberra.

NSW State Water Plan, 1984. Water Planning for New South Wales - A Preview, Water Resources Commission, Sydney, 32pp.

National Conservation Stategy, 1983. National Conservation Stategy for Australia - Living Resource Conservation for Sustainable Development, Aust. Govt. Publishing Service, Canberra.

O'Brien, W.T., McGregor, A.M. & Crawshaw, B.W., 1983. In-stream and Environmental Issues, Water 2000: Consultants Report No 9, Aust. Govt. Publishing Service, Canberra, 374pp.

Peck, A.J., Thomas, J.F. & Williamson, D.R., 1983. Salinity issues: Effects of man on salinity in Australia, Water 2000 - Consultants Report No 8, Aust. Govt. Publishing Service, Canberra, 78pp.

Pedder Inquiry, 1974. The Flooding of Lake Pedder, Final Report of the Lake Pedder Committee of Inquiry, Aust. Govt. Publishing Service, Canberra, 317pp.

POWR, 1983. Water 2000 - A Perspective On Australia's Water Resources to the Year 2000, Department of Resources and Energy, Aust. Govt. Publishing Service, Canberra, 120pp.

Public Bodies Review, 1983. Review of the Water Industry in Victoria, Vic. Govt. Printing Service, Melbourne.

The State of the Rivers, State Rivers & Water Supply Commission, Victoria, November.

White, D.R., 1983. Reform in the Water Sector, Ministerial Statement, Legislative Council, 2 December, Parliament of Victoria.

Letter

23rd October, 1984

The Hon. R.J. Hawke, M.H.R.,
Prime Minister,
Parliament House,
CANBERRA, A.C.T. 2600

Dear Prime Minister,

As President of the Australian Society for Limnology, I write to you to express our dismay over the cutback in funding for scientific research in the recent Federal budget. As a society of professional scientists we endorse the concern that has already been expressed throughout the scientific community about the serious effect this will have on Australian scientific and technological performance, and therefore ultimately on our economic viability.

More specifically, as scientists who study inland waters, we are particularly concerned about the effects of such a cutback on our own research area. Although inland water bodies are of crucial importance for Australia, supplying as they do the water for domestic, industrial, recreational and much agricultural use, and although current expenditure in the water industry is of the order of $2000 million annually, research on inland waters has always been poorly funded in this country. That this is so has belatedly been recognised, and CSIRO, for example, has recently identified water as a key area to which increased research on our inland waters, either by CSIRO or by tertiary institutions, will howeer be very difficult, perhaps impossible, if government funding for research is in real terms reduced, as proposed in the budget.

On behalf of our society I therefore urge most strongly that the government reconsider its decision to reduce funding for scientific research.

Yours sincerely,

(Dr. John T.O. Kirk)

ASL 25th ANNIVERSARY

To celebrate the 25th Anniversary of the Society, which will occur in 1986 two publications are proposed. One is a book edited by Patrick DeDekker and Bill Williams, which will review progress in Australian limnology (see the letter from Bill which follows). The other is a special edition of the Australian Journal of Marine and Freshwater Research. This issue would consist of limnological papers which will report original research results and will be subjected to the normal review processes of the journal. However, the issue may include a suitable preface and may be made availablee as a separate publication as well as an issue of AJMFR.

For the AJMFR special issue to proceed we need to have sufficient members (or non-members) with papers which they are prepared to submit for the AJMFR special issue. Manuscripts would need to be ready by mid 1985 at the latest. In order to gauge whether we are likely to have sufficient material could prospective authors write to me as soon as possible letting me know and indicating the likely topic area. The address is:

Ian Campbell
Water Studies Centre
Chisholm Institute of Technology
P.O Box 197
East Caulfield, 3145

John Kirk is contributing a chapter on " Optical Properties of Australian Inland Waters" to the forthcoming ASL Book, "Perspectives in Australian Limnology", and would be very grateful if people would send him any optical data (underwater light measurements, absorption spectra, turbidities, secchi depths etc.) that they have collected for Australian inland waters (together with information on methods used), published or unpublished, for possible inclusion (with acknowedgements, of course) in a compilation of such data that he hopes to incorporate into the computer.

His address is Dr J. Kirk, CSIRO, Division of Plant Industry, P.O. Box 1600,CANBERRA CITY, 2601, ACT

Dear Ian,

Patrick and I have started the first part of our duties as editors of the A.S.L. twenty-fifth anniversary book: we have invited contributions from a number of eminent Australian limnologists. The selection of these has proved both difficult and enlightening for we have indeed come a long way from 1961 when it was possible to count the number of Australan limnologists on one hand! We have initially invited some twenty five to contribute, but in doing so we are conscious that considerable injustice has been done to the remaining 375 or so members of the Society! As some attempt to rectify this may I invite, through the pages of your Newsletter, any Australian limnologist (young or old) who has not been invited thus far to contribute, but feels that he or she has something important to say, who is willing to meet the deadline, and who agrees to accept the conditions of refereeing, to write either to me or Patrick De Decker and make a case (best of all, a case accompanied by a short precis of any intended contribution). To give members some feel for the nature of the book, a few outlines are attached below. I realise I may be rash in writing this letter!

Best wishes,

Bill Williams.

Title: Perspectives in Australian limnology

Can you suggest a better one?

Contents: About 25 contributions (Chapters) totalling in all some 250 pages. Each contribution is planned as a leading article which (1) provides a forward-looking view of a given subject, (2) synthesises recent and current work, (3) is prepared to be specultive. Each contribution is designed to be of interest to the wider limnological (international) audience. Articles will fall into the following three areas:

(i) Articles concerned with such general subjects as:

optical properties of inland waters
hydrodynamics
thermal behaviour
chemical events
zoogeography
osmotic regulation
phytoplankton/zooplankton interactiond
dynamics of fish populations etc.

(ii) **Articles concerned with particular aquatic ecosystems but which emphasises processes rather than traditional encyclopaedic descriptors.**
streams
rivers (managed/wilderness)
tropical flood/drought rivers
wetlands
salt lakes
dams
lakes
mound springs

(iii) **Articles of applied interest** dealing with such matters as management procedures, the impact of man, and so on.

The book is likely to end with an overview chapter.

Length of chapters: About 10 printed pages (+ 3-4 pages)

Desired cost: Around US $30

Illustrations: There should be lots of these and they should be of the highest quality. If you have any difficulty in producing these (or at least good quality illustrations) we may be able to help. Only black-and-white photographs will be welcome.

Timing: The book will need to be published in early 1986 so that it can be "tabled" at the 25th Congress of the A.S.L. and also be available for the International Association for Limnology Congress in New Zealand a few months later (February 1987).

Publishers: A publisher has not yet been decided upon. Negotiations are in hand with three. However, all those publications presently in our sights will require edited and final manuscripts by August 1985.

Deadlines: To meet publishing deadlines, manuscripts will need to be in our hands by June 30, 1985. Thus, from the time you receive this letter to the deadline is just eight months.

Refereeing All papers will be subject to refereeing. However, given the reputation and expertise of scientists invited to contribute chapters, no particular problems are foreseen with regard to the quality of contributions!

REQUEST FOR CADDIS-FLY AND MAY-FLY MATERIAL

John Dean and David Cartwright are working on the taxonomy of larval and adult Caddis -flies, primarily of Victoria. They have bred out many species, but additional material is required, especially from other states of Australia. They are willing to identify any caddis material, and are maintaining a voucher collection so that a consistent system of designating species is available if formal identification is not possible.

John is also working on the taxonomy of Leptophlebiid mayflies, and requires material from the whole of Australia. Again a voucher collection is maintained and identification can be provided.

Any material forwarded would be greatly appreciated and can be sent to :

MMBW Laboratories, GPO Box 4342, Melbourne, Victoria 3001.

UNIVERSITY OF TASMANIA
DEPARTMENT OF ZOOLOGY
PRIAPULID RESEARCH GROUP

The Priapulid Research Group was formed in 1976, as a forerunner to other minor research groups, when Prof. Bartholemew Rumbold was appointed as tittular head to the Zoology Department. Its members conduct research on the application of the economically important priapulids in the semi-conductor industry, alternative protein sources for third world countries, and as a tool in the solution of common marital shortcomings.

Several projects are, or have been conducted in association with the Family Planning Clinic (FPC), the Black Rose (BR, no relation to the esteamed head) and the UN World Government.

Membership - 1984

Professor B. Rumbold B Sh Hons, Ph D (Snug) LLB (Cam) FRSBSA, FIRBBSA Ltd. Pty.
Senior Letcherer
Group Leader
Ecology and commercial use of the Priapulida in sunrise industries.

Dr A. Bigglesworth Inc.
West Wing Commander
Phylogeny of Priapulids and how to kill the Hunn.

Dr E. Flynn B Sx Hons (after an extension)
Personal Relations
Morphometrics of the ectoparasitic Priapulidae.

Dr S.J. Gould B S (Las Vegas) Ph D (Pr) FRIPS
Very Important Person (VIP)
Kudos.

Graduates of the Priapulid Research Group

Doctor of Philosophy

Joachim H.R. Phlegm 1984 Mucous production of Priapulids and the use thereof as lubricants in the aerospace industries. Funded by Wynns.

Bachelor of Science with Honours.

Wearsigone, U.C. 45 B.C.E. Facultative sex-ratio manipulation in Priapulid colonies. Presently travelling in cognito in subterranean caverns beneath Snug.

Publications and Reports of the Priapulid Research Group

Pillock, P.P. 1976. A key to the Family Planning Clinic. Journal of the Lower Sandy Bay Kindergarten Teachers Play Group 1976, 5-5.5.

Phlegm, J.H.R. & Pillock, P.P. 1976 Priapulids of Cough Harbour. Advanced Mucous Research 1976, 1-213.

Flynn, E., Flam,B., Phlegm, J.H.R. & Pillock, P.P. Female promiscuity and male reproductive success in social Priapulids. Gretna Naturalist (in pressed).

Flynn, E. & Pillock, P.P. Modifications of the sexual behaviour of hosts infested with ectoparasitic priapulids of the inner thigh. Sexual Advances in Research 1980, 57657-756765.

Phlegm, J.H.R., Flynn, E., Pillock, P.P. Flambe, B. & Pillock, P.P. Preliminary observations. Review of Annual Observations 1923, 1.

Phlegm, J.H.R., Flynn,E., Pillock, P.P., Flambe, B. & Pillock, P.P. Observations. Review of Annual Observations 1943, 1.

Phlegm, J.H.R., Flynn, E., Pillock, P.P., Flambe, B., & Pillock, P.P. Final Observations. Review of Annual Observations 1963, 1.

Phlegm, J.H.R., Flynn, E., Pillock, P.P., Flambe, B., & Pillock, P.P. Review of observations. Review of Annual Observations 1983, 1.

Flynn, E., Phlegm, J.H.R. & Pillock, P.P. A biological assessment of immature Priapulids in the lower extremities of the Sandfly River estaury. Rapport of the Hardly-Epileptic Commission. Tasmanian Report No. 3546+4563)647-48777#*6473-387-1, 1-76278.

Bigglesworth, A. & Pillock,P.P. Synthesis of Lysergic Digisyterradelfuegoupthebubumalot-(C)-infantile. Journal of Labile Compounds and Hallocinogenics!!, 1080, 784-793.

News

SANA

Scientists Against Nuclear Arms (SANA) is an independent and non-aligned association of Scientists, Engineers and Technologists whose aim is

"to halt and reverse the arms race, particularly in nuclear, biological and chemical weopons, and to work for the general promotion of world peace."

Since its formation in September, 1982, SANA (Australia) has grown to number now well over 400 members. SANA parallels similar organizations in the UK, USA, New Zealand and Europe. The Association seeks to present the facts about the arms race as objectively as possible, and to inform individuals, groups and the general public about this issue.

Scientists, engineers and technologists have a special responsibility to speak out and contribute their knowledge and expertise to the growing movement for nuclear disarmament.

You can lend your support by becoming a member of SANA. Members receive the monthly newletter, Update, with current information and articles of concern. Annual membership fee, $20.

For further information please write to:

The Secretary
PO Box 370
LANE COVE NSW 2076

Amazon Dams Challenged

BRAZIL- Tucurui Dam is the largest ever built in a tropical rainforest and the first (but the smallest) of a series of 25 dams being built by Brazil's northern energy subsidiary "Electronorte" in the Amazon Basin to provide electricity to power industrial development downstream.

A few weeks after the flooding of the reservoir began (on 6th September) Sonia Regina de Brita Pereira, a 29 year old environmentalist lawyer from Rio de Janeiro representing Brazilian conservationists, arrived in Nairobi to appeal for UN intervention to halt the destruction of the Amazon. Miss Pereira believes the Amazon stands as a classic example of the "metaproblem": a situation in which everybody knows there are many interacting multi-layered and synergistic problems forged in the hearth of environment/development conflict. But it is not at all clear what should be done about it or by whom.

The world however, may be slowly awakening to the fact that the nearly-bankrupt Brazil hopes to dig out from under its many problems by destroying large areas of the "world's lungs": the Amazon rainforest. Non-government organisations have appealed to the World Bank President, A.W. Clausen to reassess its financing of development projects which are leading to rampant deforestation, invasion of Indian lands and destruction of natural areas unsuited for agriculture but possessing tremendous biological significance.

The people Miss Pereira represents believe defoliants like 2,4-5T were used to kill tropical rainforest in the 2,432 sq km reservoir of Tucurui Dam after negotiations between Brazil and France fell through when the company chosen to clear the area went bankrupt. By killing-off the vegetation it was hoped to avoid the devastating results of drowning a living forest such as occurred at Lake Brokopondo to the north of Tucurui. When that dam was closed in 1964, large areas were inundated quickly with lethal effect on the dissolved oxygen content and chemistry layers of the water. Hyacinth bloomed, fish died, downstream pollution occurred and the generating turbines were damaged. However, WWF spokesman Tom Lovejoy says this is unlikely to happen at Tucurui as the flow rates will be high enough to prevent stagnation of rotting vegetation.

Whether or not defoliants have been used is not known for certain as the Brazilian Federal Government Secretariat will not release its reports for public scrutiny. However, TASS carried stories this month claiming that 7,000 deaths

have occurred in the area from drinking water that is believed by Miss Pereira to have been poisoned by "Electronorte" contractors. Brazil's Special Secretary for the Environment acknowledged that 20 deaths had been caused by misuse of defoliants along the power line (not, though, in the reservoir area) and says the contractor responsible has already been fined.

The environmentalists represented by Miss Pereira assert that the Brazilian government made little or no effort to undertake environmental studies of the Tucurui area or it they did they have been kept secret. Even if Tucurui is lost, they hope to force Brazil to consider whether and how it will develop the Amazon Basin.

From: Ecoforum Vol. 9, No. 4, Oct. 1984.

Herdsman Lake Wildlife Study Centre, W.A.

World Wildlife Fund Australia urgently needs help to complete a study centre at Herdsman Lake in the heart of Perth. This project is part of WWF's ongoing conservation programme directed towards the conservation of Australia's endangered flora and fauna.

Herdsman Lake is a shallow freshwater lake with rapid drainage during early summer, providing an excellent environment for freshwater waders, particularly in spring and summmer. The Study Centre will give school children from all over Perth's metropolitan area the oppurtunity to learn of the wildlife a wetland wilderness such as Herdsman Lake supports. Once complete the Centre will become a major tourist attraction for the people of Western Australia and visitors from other states and overseas interested in studying wetland birdlife close at hand.

You can help WWF Australia complete this project by simply donating money or becoming a member of WWF or both!. Pamphlets containing subscription forms and more information about Herdsman Lake are available through A.S.L. by contacting Ian Campbell.

Austria's First National Park?

For the past 10 years European conservationists have been calling on the Austrian Government to declare the riverine areas along the Donau-March-Thaya Rivers (incorporating the Danube riverine forest and the Lange Lacke wetland) Austria's first national park. Now the conservationists and the government are at loggerheads in a debate which has resounded beyond the borders of Austria: whether a hydro-electric power station and dam should be built at Hainburg, about 40km from Vienna.

Hainburg is the last bastion of riverine tranquility in a country whose national anthem is "Land der Berge, Land am Storme" (Land of the Mountain, Land along the River). Most of Europes major rivers were once flanked by similar forests filled with a rich variety of wildlife. Today 80 per cent of the Danube has been developed.

The Austrian Danube Power Corporation (DOKW) contends that the dam is needed to supply an expected increase in the Austrian energy demands of 3.6 per cent a year. Conservatonists rebut that energy needs will only rise 1.5 per cent a year and also point out that Austria is one of Europes leading exporters of electricity and that the dam is not needed to meet domestic energy demands. It is also argued that the building of the plant is a violation of two international treaties to which Austria is a Party - the Ramsar Convention on Conservation of Wetlands and the Berne Convention on the Conservation of European Wildlife and Natural Habitats. The authorities have also been criticised for failure to live up to the terms of the Washington Convention in International Trade in Endangered Species and Wild Fauna and Flora. The Danube riverine area is a Ramsar site and should be accorded international protection status, while the local provincial government is refusing to grant full protection status to the Lang Lacke area after the lease expires in 1985.

Experts appointed by the local government to look at the implications of Hainburg concluded it should be abandoned because it would cause severe forest damage and dangerously affect the quality of the areas drinking water. Once constructed the high dam walls would also prevent the regular flooding of the forest, the main natural feature on which the ecosystem is dependent.

The riverine forest is a diverse ecosystem that contains between 40 and 50 tree and shrub species and 31 different kinds of fish. A variety of organisms, thought to be extinct or severely threatened in Austria have just been re-discovered

there. The Lange Lacke wetlands is a home for thousands of migratory birds. Austria's world famous scientist and Nobel Prize winner Professor Konrad Lorenz best describes the tropical atmosphere of the forest:

"A strangely tropical effect is produced by these backwaters. The banks descend in wild luxuriance, steeply, almost vertically, to the water, and are begirt by a regular botanical garden of high willows, poplars and oaks between which hang dense strands of lush wood vine, like lianas; kingfisher and golden orioles also typical denizens of this landscape, both belong to groups of birds, the majority of whose members are tropical dwellers".

This is 8000 hectares of Central Europes largest remaining stand of primeval forest along a river steeped in history and legend. History should be made again by declaring it Austria's first national park.

From: WWF News No. 29, May-June, 1984.

ASL Awarded Boden Conference

The Australian Academy of Science provides funds for conferences to allow limited groups of scientists to come together to discuss central themes in expanding areas of research. The conferences are called "Boden Conferences" in honour of Dr. Alex Boden who provided the funds for the purpose.

The ASL successfully proposed a Boden Conference on "Stream Ecology" for February 1985. The conference is being organised by Sam Lake with some hinderance from Ian Campbell. The Boden Conference will be quite unlike other ASL conferences in several respects. The topic is restricted to "pure" stream ecology with applied problems such as human impacts on streams being deliberately avoided. Secondly, the conference will be entirely based on discussions of themes in stream ecology, with no presented papers in the traditional sense and no abstracts or proceedings. The style of the conference will be based loosely on the Gordon Conferences held in the U.S. For such a format to be successful the size of the group must be limited and the organizers have arbitrarily selected thirty as the maximum number of participants.

Book Review

METALS IN THE HYDROCYCLE

by W. Salomons and U. Forstner

Springer-Verlag, Heidelberg 1984 (price $?)

Reviewed by Barry Hart

In the words of the authors, this book aims to present the "available knowledge on the movement of trace metals along the hydrological cycle".

The book is divided into two sections. The first part (Chapters 2 and 3) considers processes involved in the interaction between heavy metals and ligands, particulate matter, sediments and organisms. Additionally, the transport of heavy metals and diagenetic processes occurring in the sediments are covered. The second part of the book covers the behaviour of heavy metals in the individual parts of the hydrological cycle; the atmosphere (Chapter 4), continental waters (Chapter 5), estuarine and coastal environments (Chapter 6) and the oceans (Chapter 7).

In all sections the authors have gone to considerable lengths to ensure their information base is the most up-to-date possible. The reference list is a most comprehensive and up-to-date coverage of the major literature on heavy metals.

A pleasing feature of the book is that the authors have not simply summarised the current literature, but have drawn together the relevant information necessary for an understanding of the processes operating to influence the behaviour of heavy metals in aquatic systems. Some excellent diagrams assist the reader in understanding the more difficult concepts.

The book has a relatively large number of typographical errors which, while not interfering with the meaning, are somewhat irritating to the reader. It is hoped that the publisher will attend to these in subsequent editions. In Table 70 the data for lead is incorrect and misleading. It is well known that the contribution of lead to the atmosphere and the ocean from combustion, including motor cars, far exceeds that contributed from natural sources.

In summary, this book is a must for all those working in the heavy metal field. It will be useful for undergraduate and post graduate students, practising scientists as well as environmental managers, who wish to obtain the most up-to-date information on the processes influencing heavy metals in the aquatic environment and the atmosphere.

Stream Protection Symposium at Chisholm

An international symposium on stream protection will be held at Chisholm Institute of Technology on February 12th and 13th, 1985. Topics which will be dealt with will include minimum flow requirements for streams, the impact of reservoir construction and operation, the influence of riparian vegetation and criteria for evaluating streams. Speakers will include Professor Ken Cummins from Oregon State University and Ms Laurel Tierney from the Ministry of Agriculture and Fisheries in New Zealand and Dr Mike Winterbourn from the University of Canterbury also in New Zealand.. The registration fee is $100 ($50 for students). Potential participants should contact:

Mr. T. Davies
Water Studies Centre
Chisholm Institute of Technology
CAULFIELD EAST, 3145.

Coming Events

12-16 February 1985.
Environment for Life : International Conference on Environmental Management in Developing Countries.
Venue : Manila, Philipines.
Details : Infinity Plus, Unit 7E Vernida I Building, 120 Amorsolo Street, Legaspi Village, Makati, Metro Manila, Philipines.

12-13 February 1985
International Symposium on Stream Protection.
Venue : Chisholm Institute of Technology, Melbourne.
Details : Ian Campbell, Water Studies Centre, Chisholm Institute of Technology, East Caulfield, 3145.

August 1986

Global Connections in Ecological Theory and Practice.

Venue : State University of New York, USA.

Details : IV International Congress of Ecology, SUNY College of Environmental Science and Forestry, Syracuse, NY 13210, USA.

8 to 14 February 1987.

XXIII Congress of the International Association of Theoretical and Applied Limnology (S.I.L.)

Venue : Hamilton, New Zealand.

Details : Theme : Water, to use and enjoy. Further information will become available through Tyler.

February 1987

Fifth International Conference on Ephemeroptera.

Venue : Marysville, Victoria.

Details : Dr I. Campbell, Water Studies Centre, Chisholm Institute of Technology, East Caulfield 3145.

February 1987

Ninth International Conference on Plecoptera.

Venue : Marysville, Victoria.

Details : Dr I. Campbell, Water Studies Centre, Chisholm Institute of Technology, East Caulfield 3145.

INSTITUTE OF
BIOLOGY
IN AUSTRALIA

MEMBERSHIP INFORMATION 1983-1984

Science Centre
35-43 Clarence Street, Sydney 2000

INSTITUTE OF BIOLOGY IN AUSTRALIA

The Institute of Biology was formed in the United Kingdom in 1950. Its initial membership of 500 included some of the most prominent biologists of the day. It was granted a royal charter in 1980. In 1982 its membership had grown to 17,000 of which about 1500 were biologists living outside the British Isles.

The Institute is well known through its publications which include the widely read series *Studies in Biology,* the *Journal of Biological Education* and the *Biologist.* It is also prominent in education and was responsible for the introduction of the Higher National Diploma in Biology and the Certificate in Applied Biology. It has been very active in public affairs and has expressed the views of biologists to several royal commissions and other government bodies.

In 1975 the Institute was a founder member of the European Community Biologists Association; a body which represents the views of some 60,000 professional biologists.

The Institute is the body which sets the professional standards for biology. Its membership is drawn from all fields of biological activity including agriculture, education, forestry and medicine, as well as science. It confers on its members a status similar to that of members of other professional institutes such as the Royal Australian Chemical Institute and the Australian Institute of Physics.

Institute of Biology in Australia

In 1983, 186 members of the Institute resident in Australia formed the **Institute of Biology in Australia (IBA)** which is a branch of the Institute of Biology. After a transition period it is expected that the **IBA** will become fully autonomous but remain in fraternal association with the Institute of Biology and with other organisations representing professional biologists in other countries.

Objectives

The **Institute of Biology** i
the profession in Australi
research in biology, to i
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biologists by using their k
of government, other org
and individuals.

Membership

The standards required fo
bership are as follows:

Fellow: members wit
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Member: normally req
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Graduate: is for those w
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Associate: normally req

Affiliate: offers full par
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Student: for those s
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Fellows and members
are entitled to use the de
MIBiol, respectively.

Activities

The **IBA** is currently cor
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As the **Institute** gro
will include:

- Representation to
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speak on behalf of qualified
knowledge to advise all levels
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and regional importance;

- Publication of a newsletter to include notices of forthcoming meetings, news of associated biological societies, job vacancies, etc.;
- Organisation of symposia and colloquia on broad biological topics;
- Liaison with biological and other learned societies, other professional institutes and the Australian Academy of Science;
- Promotion of research into biological issues of significance to the community; and the
- Stimulation of interest in biology in schools and encouragement of dialogue between members of each tier of biological education and other professional biologists in research and industry.

Membership fees

Between $20 and $50 depending on level of membership. A small charge to cover administrative costs is made on application.

Benefits from belonging to IBA

- Membership of an international professional institute which is widely respected and highly influential.
- Copy of the journal *Biologist.*
- Newsletter published by the IBA.
- 25 per cent reduction in purchasing *Studies in Biology.*
- 40-50 per cent reduction in subscriptions to *Journal of Biological Education* and *Journal of Biosocial Sciences.*
- Advice and information service.
- Access to the Institute secretariat and use of facilities in the United Kingdom.
- An opportunity to participate actively in the work of the IBA from its inception.

Enquiries

Further information about the work of the IBA may be obtained from the Honorary Secretary.

Enquiries about membership should be directed to the Membership Officer using the request for information form included in this leaflet.

To the Membership Officer,
Institute of Biology in Australia,
Science Centre,
35-43 Clarence Street,
Sydney 2000.

Please send me an application form and further details about membership of the IBA.

Name: .....

.....

Address: .....

.....

.....

.....

Telephone (office): .....

(home): .....

Please tick if you would like the nearest committee member to telephone or contact you ☐

Signed .....

Date .....

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